8. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

(i) Solve, for $0 \leqslant \theta < 180$

$$4\tan^2(2\theta - 30)° + 1 = 49$$

giving the answers to one decimal place.

(5)

(ii) Solve, for $0 \leqslant x < 2\pi$

$$2\tan x \sin x + 3 = 0$$

giving the answers, in radians, in the form $k\pi$ where k is a rational constant.

(5)

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Question 8 continued

Question 8 continued

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Question 8 continued

(Total for Question 8 is 10 marks)

9. A company mines lithium.

- in year 1, the company mined 12 400 tonnes of lithium
- in year 15, the company is predicted to mine 7 500 tonnes of lithium

Model *A* assumes that the mass of lithium the company mines will decrease by the same amount each year.

According to model *A*,

(a) find the mass of lithium the company will mine in year 5

(3)

(b) calculate the **total** mass of lithium the company will mine from year 1 to year 15 inclusive.

(2)

Model *B* assumes that the mass of lithium the company mines will decrease by the same percentage each year.

(c) Find, according to model *B*, the mass of lithium the company will mine in year 10. Give the answer to the nearest 10 tonnes.

(3)

According to model *B*, there is a limit to the **total** mass of lithium that can be mined.

(d) Calculate the value of this limit. Give the answer to the nearest 100 tonnes.

(2)

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